I. Amendments to the Claims

1. (Currently Amended) Connection system for conduits, fittings or assemblies which are intended for carrying gaseous carbon dioxide [a fluid] acted upon by a pressure increased with respect to a reference pressure, ~~in particular for systems carrying carbon dioxide,~~

comprising

a first coupling part,

a second coupling part,

capable of being introduced into the first coupling part along an axis, and at least one gas-permeable circumferential seal which consists of an elastomer and is arranged in a groove, the groove defining ~~which has~~ a groove depth and a groove length and being ~~which is~~ formed circumferentially in one of the first and second coupling parts,

the second coupling part being capable of being plugged in with a shank into a round receiving orifice of the first coupling part,

whereby, after plugging-in, the circumferential seal,

while undergoing deformation from a non-pressed state to a deformed state and

generating a radial prepressing force,

~~sealing~~ seals off a gap formed between the first and second coupling parts with a gap width between the outer radius of the shank and the inner radius of the receiving orifice and

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at the same time ~~bearing~~ bears against the first and second coupling parts at least over a contact length,

~~running~~ measured in the axial direction perpendicularly to the inner and outer radius of the first and second coupling parts,

and whereby ~~wherein~~ the cross section of the nonpressed circumferential seal, the groove depth and the gap width and the groove length are coordinated with one another in such a way,

that[[,]] a ratio is defined that determines a permeation of the carbon dioxide through the circumferential seal,

said ratio being defined

by ~~ratio of~~ a permeation-active partial circumferential area of the circumferential seal,

which is located in the vicinity of the gap on the side of the circumferential seal,

where is acting the reference pressure and

where the seal is pressed by the increased pressure in

the axial direction against one wall of the groove,

which is determined by an arcuate line of a pressed radial cross-

sectional area of the deformed circumferential seal, and

in relation to the contact length ~~that determines a permeation through the circumferential seal~~,

the permeation-active partial circumferential area is no greater than ~~half~~ one fifth of the value of a cross-sectional area of the deformed circumferential seal,

~~the~~ said cross-sectional area running perpendicularly to the axial direction.

2. (Previously Presented) Connection system according to Claim 1, wherein the cross section of the nonpressed circumferential seal, the groove depth the gap width and the groove length are coordinated in such a way that, the ratio, of the permeation-active partial circumferential area of the circumferential seal to the contact length that determines the permeation through the circumferential seal, the partial circumferential area is no greater than one fifth of the value of a cross-sectional area of the deformed circumferential seal, the said cross-sectional area running perpendicularly to the axial direction.

3. (Previously Presented) Connection system according to Claim 1, wherein the partial circumferential area is arranged in the vicinity of the gap and is determined by an arcuate line of a pressed radial cross-sectional area of the deformed circumferential seal.

4. (Previously Presented) Connection system according to Claim 3, wherein a length of the arcuate line assumes minimally the value of the gap width in the case of a disappearing arcuate curvature and at maximum is no greater

than half the value, preferably one quarter of the value, of the sum of the gap width and of the groove depth.

5. (Previously Presented) Connection system according to Claim 1, wherein the cross section of the nonpressed circumferential seal, the groove depth, the gap width, and the groove length are coordinated in such a way that the permeation-active partial circumferential area is independent of a cord thickness of the nonpressed circumferential seal.

6. (Previously Presented) Connection system according to Claim 1, wherein the size of a contact length between the inner radius of the first coupling part and the circumferential seal is dimensioned according to the equation

$$KL_1 = C1\sqrt{\frac{F_V R_{RS}}{E_D R_{OI}}}$$

C1 being a constant, F_V being the prestressing force acting in the radial direction, R_{OI} being the inner radius of the first coupling part, E_D being the value of the modulus of elasticity of the circumferential seal, and R_{RS} being a measure of the convex curvature of the seal, for example the cord radius of an O-ring seal in a nonpressed state.

7. (Previously Presented) Connection system according to Claim 1, wherein a degree of filling of the groove, calculated, taking into account the possible thermal expansion of the circumferential seal, as a quotient of a fraction, lying in the groove, of the pressed radial cross section of the circumferential seal and the cross-sectional area of the groove, lies in the range of 58.0 percent to 100.0 percent.

8. (Previously Presented) Connection system according to Claim 1, wherein in the case of an asymmetric position of the circumferential seal in the groove, taking into account the possible thermal expansion of the circumferential seal, a degree of filling of the groove, calculated as a quotient of a comparatively larger fraction, lying in one half of the cross-sectional area of the groove, of the pressed radial cross section of the circumferential seal and of half the cross-sectional area of the groove, lies in the range of 58.0 percent to 100.0 percent.

9. (Previously Presented) Connection system according to Claim 1, wherein the cross section of the circumferential seal has, in the nonpressed state, a preform, in which a quotient of an axial main extent and of a radial main extent of the seal cross section has a value of greater than 1.

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10. (Previously Presented) Connection system according to Claim 1, wherein the cross section of the circumferential seal in the nonpressed state has an elliptic form.

11. (Currently Amended) Connection system according to ~~one of Claims 1 to 9~~ Claim 1, wherein the cross section of the nonpressed circumferential seal is composed of two semicircular areas or areas in the form of a segment of a circle and a rectangular area lying between the areas.

12. (Previously Presented) Connection system according to Claim 1, wherein the cross section of the nonpressed circumferential seal has a generally rectangular shaped configuration which has two longitudinal sides curved convexly with a first radius of curvature, two transverse sides curved convexly with a second radius of curvature and four corners rounded convexly with a third radius of curvature.

13. (Previously Presented) Connection system according to Claim 12, wherein the third radius of curvature is smaller than the first radius of curvature and the first radius of curvature is smaller than the second radius of curvature.

14. (Previously Presented) Connection system according to Claim 1, wherein the circumferential seal is formed by an O-ring with a cross section which is circular in the nonpressed state, in which the ratio of the inside diameter

to the thickness of its cord is smaller than or equal to 6, and in which a minimum pressing lies in a range of more than 15 percent.

15. (Previously Presented) Connection system according to Claim 1, wherein the contact length of the radial cross section of the deformed circumferential seal differs by less than 15 percent, from a maximum axial permeation length through the circumferential seal.

16. (Previously Presented) Connection system according to Claim 1, wherein the first coupling part or the second coupling part consists of metallic materials.

17. (Previously Presented) Connection system according to Claim 1, wherein a maximum roughness value of the surfaces of the coupling parts, at least in the region of the outer radius of the shank and of the inner radius of the receiving orifice, where the circumferential seal comes to bear, is lower than 16 µm.

18. (Previously Presented) Connection system according to Claim 1, wherein the surfaces of the coupling parts, at least in the region of the outer radius of the shank and of the inner radius of the receiving orifice, where the circumferential seal comes to bear, are produced by the smooth rolling of faces

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which, as compared with the machined surfaces, have an over dimension of 0.018 mm to 0.040 mm and a roughness in the range of 1.6 to 3.2 μm.

19. (Previously Presented) Connection system according to Claim 1, wherein the circumferential seal includes a polymeric fluorocarbon compound, of synthetic rubber.

20. (Previously Presented) Connection system according to Claim 1, wherein the circumferential seal has a Shore A hardness in the range of 70 to 90.

21. (Previously Presented) Connection system according to Claim 1, wherein two or more circumferential seals are arranged one behind the other in the axial direction.

22. (Previously Presented) Connection system according to Claim 21, wherein an outer circumferential seal accessible to the surrounding atmosphere has a reduced permeability coefficient than an inner circumferential seal protected from the surrounding atmosphere by the outer circumferential seal.

23. (Cancelled)

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24. (Currently Amended) Connection system according to Claim 1, wherein the pressure acting upon the ~~fluid~~ carbon dioxide, lies in the range of about 10 bar to 180 bar.

25. (Currently Amended) Connection system according to Claim 1, wherein a value of the quantity of the ~~fluid~~ carbon dioxide, which has penetrated through the circumferential seal as a result of permeation is no greater than about 2.5 g per year and connection.

26. (Previously Presented) Connection system according to Claim 1, wherein the ratio determining the permeation through the circumferential seal is no greater than 50.0 mm, at room temperature.

27. (Previously Presented) Connection system according to Claim 1, wherein the ratio determining the permeation through the circumferential seal is no greater than 4.5 mm, at 100°C.

28. (Previously Presented) Connection system according to Claim 1, wherein the ratio determining the permeation through the circumferential seal is no greater than 1.00 mm, preferably no greater than 0.25 mm at 150°C.

29. (Previously Presented) Connection system according to Claim 1, wherein a plugging force which can be applied for plugging-in, while the

circumferential seal undergoes deformation and the radial prepressing force is generated, is, in the case of an inner radius of the first coupling part in a range of about 6 mm to 13 mm, lower than 100 N.

30. (Previously Presented) Connection system according to Claim 1, wherein the circumferential seal is provided with a gas barrier coating.

31. (Cancelled).

32. (New) Connection system for conduits, fittings or assemblies which are intended for carrying gaseous carbon dioxide

acted upon by a pressure increased with respect to a reference pressure,

comprising

a first coupling part,

a second coupling part,

capable of being introduced into the first coupling part along an axis, and at least one gas-permeable circumferential seal which consists of an elastomer and is arranged in a groove, the groove having a groove depth and a groove length

and being formed circumferentially in one of the first and second coupling parts,

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the second coupling part being capable of being plugged with a shank into a round receiving orifice of the first coupling part,

whereby, after plugging-in, the circumferential seal,

while undergoing deformation from a non-pressed state to a deformed state and

generating a radial prepressing force,

seals off a gap with a gap width between the outer radius of the shank and the inner radius of the receiving orifice and

at the same time against the first and second coupling parts at least over a contact length,

which is running in the axial direction perpendicularly to the inner and outer radius of the first and second coupling parts,

and whereby the cross section of the nonpressed circumferential seal, the groove depth and the gap width and the groove length are coordinated with one another in such a way,

that in a ratio, that determines a permeation through the circumferential seal,

said ratio being defined

by a permeation-active partial circumferential area of the circumferential seal,

which is located in the vicinity of the gap on the side of the circumferential seal

where is acting the reference pressure and

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where the seal is pressed by the increased pressure in the axial direction against one wall of the groove,

which is determined by an arcuate line of a pressed radial cross-sectional area of the deformed circumferential seal, and

in relation to the contact length,

the permeation-active partial circumferential area is not greater than half the value of a cross-sectional area of the deformed circumferential seal,

said cross-sectional area running perpendicularly to the axial direction and

said ratio determining the permeation through the circumferential seal

being not greater than 1.00 mm, at a temperature of 150°C.

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